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Landscape design of a private residential garden in Giarmata Vii, Timiș County

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Abstract: *The paper analyses, as a case study, the implemented landscape design of a single-family house garden in Giarmata Vii, a peri-urban locality near Timișoara. The aim was to assess how ecodesign principles (adaptation to context, rational use of resources, the structural role of vegetation and durability) can be applied in a small residential project. The 900 m² plot was organised into a central lawn, planting islands edged with decorative stone, a side path with a repetitive planting rhythm and a social terrace. The planting scheme has 20 taxa and 103 plants plus 160 m² of roll-out turf, with drip irrigation run by a Wi-Fi controller with a rain sensor and wirelessly controlled lighting. The final cost was 110,758 lei, 48.4% of it labour. The garden mainly provides regulating and cultural ecosystem services; plant diversity and rainwater harvesting are the points to develop.*

Keywords: ecodesign, ecosystem services, functional zoning, drip irrigation, outdoor lighting, cost analysis

• Introduction

Peri-urban residential growth has fragmented green spaces. Private gardens are now seen as part of local green infrastructure [1], able to support biodiversity [2] and to reduce the urban heat island effect [3]. Ecosystem service frameworks allow residential green spaces to be assessed as functional systems, not only as decoration [4].

Ecodesign means reconciling functional, aesthetic and ecological requirements by adapting solutions to local soil and climate, using water and materials rationally and giving vegetation a structural role [5]. The aim was to analyse how these principles were applied in an implemented garden in Giarmata Vii, Timiș County.

• Material and method

The 900 m² plot lies in the Timiș Plain near Timișoara, with flat relief, generally fertile soils and a temperate-continental climate with sub-Mediterranean influences, where hot, dry summers alternate with heavy rain.

The case study had four stages: a literature review on ecodesign and landscape composition; site analysis by direct observation and from the technical documentation; analysis of the implemented solutions against ecodesign principles; and the area balance, plant inventory and bill of quantities at execution prices. The works were documented photographically (Figure 1).

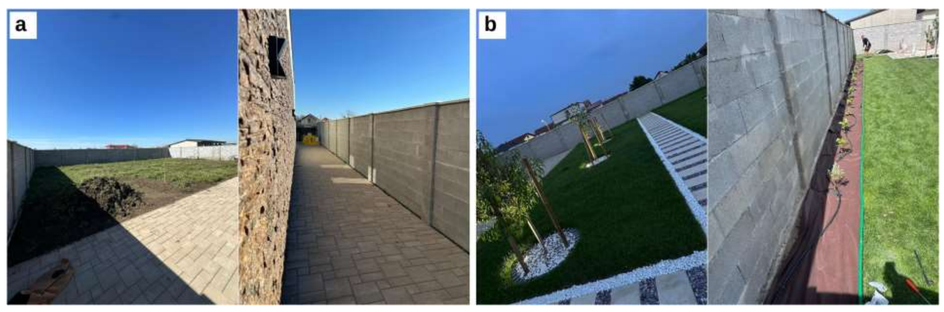


Figure 1. The garden in Giarmata Vii: a – initial situation; b – the garden after landscaping

Table 1. Structure and cost of the planting material

Plant group	Taxa	Plants	Cost (lei)
Ornamental trees	5	16	3,600
Fruit trees	6	6	78
Shrubs	3	26	1,675
Perennials and ornamental plants (incl. standard roses)	6	55	1,885
Roll-out turf (sports type)	–	160 m²	5,600
Total	**20**	**103 + 160 m²**	**12,838**

Table 2. Area balance

Land use	Area (m²)	% of total
House	300	33.33
Paths of marble and travertine slabs	40	4.44
Paving	170	18.89
Terrace	40	4.44
Trees and shrubs	50	5.56
Lawn	160	17.78
Areas not itemised in the bill of quantities	140	15.56
Total	**900**	**100.00**

• Results and discussions

The design rests on simple zoning: an open lawn area, peripheral planting islands and a terrace and barbecue area that extends the house. Unity (the lawn as a continuous background), asymmetric balance, rhythm along the side path, contrast of textures and spatial hierarchy guide the composition [5, 6]. The side path of alternating marble and travertine slabs links the front and back of the yard.

Along the path, *Cupressocyparis* × *leylandii*, *Carex morrowii* and *Lavandula angustifolia* alternate in a regular rhythm. *Lagerstroemia indica*, *Photinia* × *fraseri* ‘Red Robin’ and *Buddleja davidii* give volume in front, *Hydrangea macrophylla* lines the back fence and a multi-stemmed *Liquidambar styraciflua* is the vertical dominant (Table 1).

All planted areas are drip-irrigated through a Wi-Fi controller with a rain sensor, and marble mulch limits weeds and evaporation (Figure 2). Water pipes (60 cm) and cables (40 cm) were buried before the finishes, so no finished surface had to be opened later (Table 3). The effective green space is 210 m² (23.3%), less than the hard surfaces (Table 2). The garden mainly provides regulating and cultural ecosystem services, while its biodiversity value is limited by the few taxa and the large paved share [2]. The final cost was 110,758 lei (about 123 lei/m²): labour 48.4%, materials and equipment 26.5%, design 13.5% and planting material 11.6%.



Figure 2. Design details: a – planting islands mulched with decorative marble; b – perimeter lighting of the path

Table 3. Ecodesign principles and the implemented solutions

Principle	Implemented solution
Adaptation to local context	tolerant species; sandy soil brought in for the lawn
Rational use of water	drip irrigation; Wi-Fi controller with rain sensor
Rational use of materials	marble, travertine, granite; durable mineral mulch
Structural role of vegetation	*Cupressocyparis* hedge, *Hydrangea* screen, *Liquidambar* dominant
Durability over time	buried networks in conduits, IP65 junction boxes
Quality of living	social terrace; wireless LED lighting

• Conclusions

On a 900 m² peri-urban plot, zoning around a continuous lawn, planting islands and a social terrace produced a coherent, easy-to-use garden.

Smart drip irrigation, mineral mulch and wireless lighting adapt ecodesign to real use and lower water consumption and maintenance costs.

More species that support local biodiversity and a rainwater harvesting system are recommended for the next stage.

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